



TG/90/4(proj.)
ORIGINAL: English
DATE : 2000-07-13

INTERNATIONAL UNION
FOR THE PROTECTION
OF NEW VARIETIES OF
PLANTS

UNION INTERNATIONALE
POUR LA PROTECTION
DES OBTENTIONS
VÉGÉTALES

INTERNATIONALER
VERBAND ZUM SCHUTZ
VON PFLANZEN-
ZÜCHTUNGEN

UNIÓN INTERNACIONAL
PARA LA PROTECCIÓN
DE LAS OBTENCIONES
VEGETALES

DRAFT

GUIDELINES
FOR THE CONDUCT OF TESTS
FOR DISTINCTNESS, UNIFORMITY AND STABILITY

CURLY KALE
(Brassica oleracea L.
convar. acephala (DC) Alef.
var. sabellica L.)

These Guidelines should be read in conjunction with document TG/1/2, which contains explanatory notes on the general principles on which the Guidelines have been established.

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I. Subject of these Guidelines

These Test Guidelines apply to all varieties of *Brassica oleracea* L. convar. *acephala* (DC.) Alef. var. *sabellica* L.

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the seed required for testing the variety is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must make sure that all customs formalities are complied with. The minimum quantity of seed to be supplied by the applicant in one or several samples should be:

25 g.

The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing seed in the country in which the application is made. The germination capacity should be as high as possible.

2. The plant material must not have undergone any treatment unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of Tests

1. The minimum duration of tests should normally be two independent growing cycles.

2. The tests should normally be conducted at one place. If any important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.

3. The tests should be carried out under conditions ensuring normal growth. The size of the plots should be such that plants or parts of plants may be removed for measurement and counting without prejudice to the observations which must be made up to the end of the growing period. Each test should include a total of 80 plants which should be divided between two or more replicates. Separate plots for observation and for measuring can only be used if they have been subject to similar environmental conditions.

4. Additional tests for special purposes may be established.

IV. Methods and Observations

1. Unless otherwise indicated, all observations determined by measurement, weighing or counting should be made on 20 plants or parts taken from each of 20 plants.

2. For the assessment of uniformity of hybrid varieties, a population standard of 1% with an acceptance probability of at least 95% should be applied. In the case of a population size of 80 plants, the maximum number of off-types allowed would be 2.

3. Unless otherwise indicated, all observations on the foliage should be made on fully developed leaves which show no sign of senescence.

V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of distinctness. Characteristics which are suitable for grouping purposes are those which are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.

2. It is recommended that the competent authorities use the following characteristics for grouping varieties:

- (a) Leaf: anthocyanin coloration (characteristic 5)
- (b) Leaf blade: color of fully developed leaf (characteristic 8)
- (c) Leaf blade: density of "curling" (on leaves at middle of plant) (characteristic 14)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the Table of Characteristics should be used.

2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of the different characteristics.

3. Legend:

(*) Characteristics that should be used on all varieties in every growing period over which the examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

(+) See Explanations on the Table of Characteristics in Chapter VIII.

(1) The optimum stage of development (growth key) for the assessment of each characteristic is indicated by a number in the second column. The stages of development (growth key) denoted by each number are described at the end of Chapter VIII.

VII. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

	Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.	220-240	Plant: height	Plante: hauteur	Pflanze: Höhe	Planta: altura		
(*)		short	basse	niedrig	baja	Niedriger grüner krauser	3
		medium	moyenne	mittel	media	Frosty, Hammer	5
		tall	haute	hoch	alta	Westlandse Herfst	7
2.	220-240	Plant: width	Plante: largeur	Pflanze: Breite	Planta: anchura		
		narrow	étroite	schmal	estrecha		3
		medium	moyenne	mittel	media	Spurt	5
		broad	large	breit	ancha	Hammer	7
3.	140-240	Plant: shape (fully grown plants prior to senescence)	Plante: forme (à maturité complète, avant la sénescence)	Pflanze: Form (ausgewachsene Pflanze vor der Vegetationsruhe)	Planta: forma (plantas completamente crecidas antes de senecer)		
(*)		flat	plan	flach	plano	Kobolt, (Lav Kruset)	1
(+)		dome	en dôme	kuppelförmig	cupuliforme	Fribor	2
		pyramid	pyramidale	pyramidenförmig	piramidal	Mossbor	3
		column	cylindrique	säulenförmig	colummar	Arsis, Westlandse Herfst	4
4.	140-180	<u>Only varieties of dome, pyramid or column shape:</u> Plant: position of growing point in relation to top of plant	<u>Variétés en dôme, pyramidales ou cylindriques</u> <u>seulement:</u> plante: position du point végétatif par rapport au sommet de la plante	<u>Nur Sorten mit kuppelförmiger, pyramidenförmiger oder säulenförmiger</u> <u>Form:</u> Pflanze: Position des Vegetationspunkts im Verhältnis zur Pflanzenspitze	<u>Sólo variedades cupuliformes:</u> Planta: posición del punto vegetativo en relación al extremo superior de la planta		
(+)		same level	au même niveau	auf gleicher Höhe	al mismo nivel	Pentland Brig, Lav opretvoksende	1
		slightly below	faiblement au-dessous	leicht unterhalb	ligeramente por debajo	Spurt	2
		deeply below	fortement au-dessous	weit unterhalb	muy por debajo	Moosbor	3

	Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5. (*)	60-220	Leaf: anthocyanin coloration	Feuille: pigmentation anthocyanique	Blatt: Anthocyanf�rbung	Hoja: pigmentaci�n autoci�nica		
		absent	absente	fehlend	ausente	Lerchenzungen, Pentland Brig,	1
		present	pr�sente	vorhanden	presente	Garna Red	9
6.	140-180	Leaf: distribution of anthocyanin coloration	Feuille: distribution de la pigmentation anthocyanique	Blatt: Verteilung der Anthocyanf�rbung	Hoja: distribuci�n de la pigmentaci�n autoci�nica		
		only petiole and midrib	p�tiolle et nervure m�diane uniquement	nur Stiel und Mittelrippe	solamente el peciolo y el nervio central		1
		only petiole, midrib and leaf blade margin	p�tiolle, nervure m�diane et bord du limbe	nur Stiel, Mittelrippe und Blattspreitenrand	solamente el peciolo, el nervio central y el borde del limbo		2
		entire leaf	feuille enti�re	vollst�ndiges Blatt	la hoja completa	Garna Red	3
7.	140-180	Leaf blade: color of <u>young</u> leaf	Limbe: couleur de la feuille <u>jeune</u>	Blattspreite: Farbe des <u>jungen</u> Blattes	Limbo: color de la hoja <u>joven</u>		
		yellow green	vert-jaune	gelbgr�n	verde amarillento	Frosty, Hammer	1
		green	vert	gr�n	verde	Dwarf Green Curled	2
		grey green	vert-gris	graugr�n	verde gris	Lerchenzungen	3
		blue green	vert-bleu	blaugr�n	verde azul	Vates	4
		blue	bleu	blau	azul		5
		red or purple	rouge ou pourpre	rot oder purpurn	rojo o p�rpura	Garna Red	6

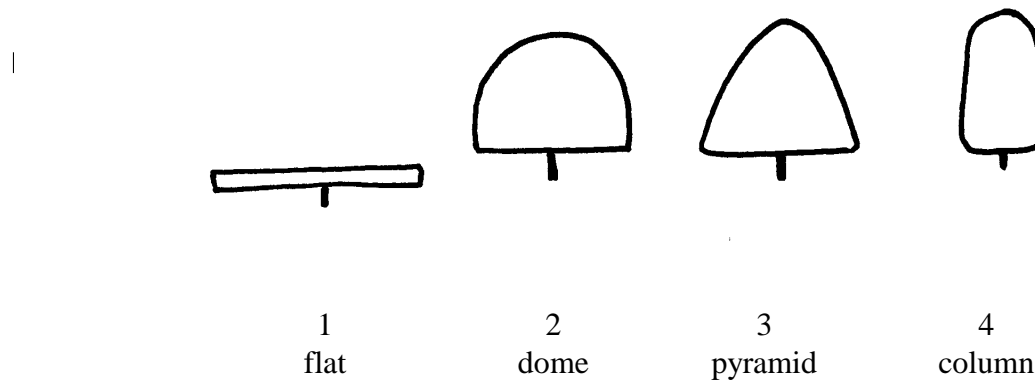
Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
8. (*)	140-180	Leaf blade: color of <u>fully developed</u> leaf	Limbe: couleur de la <u>feuille compl�tement d�velopp�e</u>	Blattspreite: Farbe des <u>vollentwickelten</u> Blattes	Limbo: color de la <u>hoja completa-mente desarrollada</u>	
		yellow green	vert-jaune	gelbgr�n	verde amarillento	Hammer 1
		green	vert	gr�n	verde	Frosty 2
		grey green	vert-gris	graugr�n	verde gris	Lerchenzungen 3
		blue green	vert-bleu	blaugr�n	verde azul	Vates 4
		blue	bleu	blau	azul	5
		red or purple	rouge ou pourpre	rot oder purpurn	rojo o p�rpura	Garna Red 6
9.	140-180	Leaf: intensity of color of <u>fully developed</u> leaf	Feuille: intensit� de la couleur de la <u>feuille compl�tement d�velopp�e</u>	Blatt: Intensit�t der Farbe des <u>vollentwickelten</u> Blattes	Hoja: intensidad de la color de la <u>hoja completamente desarrollada</u>	
		light	claire	hell	clara	3
		medium	moyenne	mittel	media	5
		dark	fonc�e	dunkel	oscura	7
10. (*)(+)	140-180	Leaf blade: shape	Limbe: forme	Blattspreite: Form	Limbo: forma	
		very narrow elliptic	elliptique tr�s �troite	sehr schmal elliptisch	el�ptica muy estrecha	Lerchenzungen 1
		very narrow elliptic to narrow elliptic	elliptique tr�s �troite � elliptique �troite	sehr schmal elliptisch bis schmal elliptisch	el�ptica muy estrecha a el�ptica estrecha	Kobolt 2
		narrow elliptic	elliptique �troite	schmal elliptisch	el�ptica estrecha	Hammer 3
		narrow elliptic to elliptic	elliptique �troite � �troite	schmal elliptisch bis elliptisch	el�ptica estrecha a el�ptica	Frosty, Halbhoher gr�ner krauser 4
		elliptic	elliptique	elliptisch	el�ptica	Westlandse Herfst 5
11. (*)	140-180	Leaf blade: length	Limbe: longueur	Blattspreite: L�nge	Limbo: longitud	
		short	court	kurz	corta	Vates 3
		medium	moyen	mittel	media	Spurt 5
		long	long	lang	larga	Lerchenzungen 7

Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
12. 140-180 (*)	Leaf blade: width	Limbe: largeur	Blattspreite: Breite	Limbo: anchura		
	narrow	�troit	schmal	estrecha	Vates	3
	medium	moyen	mittel	media	Spurt	5
	broad	large	breit	ancha	Westlandse Herfst	7
13. 140-180 (+)	Leaf blade: curvature of mid-rib	Limbe: courbure de la nervure m�diane	Blattspreite: Biegung der Mittelrippe	Limbo: curvatura del nervio central		
	weak	faible	gering	d�bil	Lerchenzungen	3
	medium	moyenne	mittel	media	Hammer	5
	strong	forte	stark	fuerte	Halbhoher gr�ner krauser	7
14. 140-180 (*)	Leaf blade: density of "curling" (on leaves at middle of plant)	Limbe: densit� de "frisure" (sur les feuilles au milieu de la plante)	Blattspreite: Dichte der "Kr�uselung" (auf den Bl�ttern in der Pflanzenmitte)	Limbo: densidad del "rizado" (en las hojas en la mitad de la planta)		
	flat leaf with coarse margin undulation	feuille plane avec ondulation grossi�re du bord	flaches Blatt mit grober Randwellung	hoja plana con ondulaci�n grosera del borde	Pentland Brig	1
	medium margin undulation with small area of flat leaf visible	ondulation moyenne du bord avec une petite zone visible de feuille plane	mittlere Randwellung mit einer kleiner Zone von sichtbarem flachen Blatt	ondulaci�n mediana del borde con una peque�a zona de hoja plana visible	Garna Red	2
	fine margin undulation with small area of flat leaf visible	ondulation fine du bord avec une petite zone visible de feuille plane	feine Randwellung mit einer kleiner Zone von sichtbarem flachen Blatt	ondulaci�n fina del borde con una peque�a zona de hoja plana visible	Westlandse Herfst	3
	fine margin undulation with no flat leaf visible	ondulation fine du bord sans feuille plane visible	feine Randwellung ohne sichtbarem flachen Blatt	ondulaci�n fina del borde sin hoja plana visible	Halbhoher gr�ner krauser	4

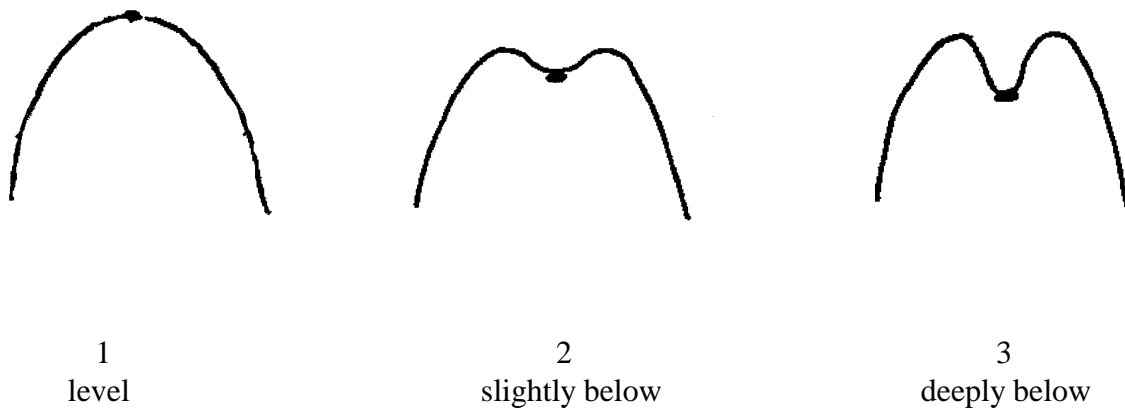
Stage ¹⁾ Stade ¹⁾ Stadium ¹⁾ Estadio ¹⁾	English	fran�ais	deutsch	espa�ol	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15. 140-180 (+)	Leaf blade: folding in transverse section	Limbe: plissement en section transversale	Blattspreite: Faltung im Querschnitt	Limbo: plagado en secci�n transversal		
	weak	faible	gering	d�bil	Pentland Brig	3
	medium	moyen	mittel	media	Vates	5
	strong	fort	breit	fuerte	Lerchenzungen	7
16 140-180 (*)	Petiole: attitude at middle of plant	P�tirole: port au milieu de la plante	Blattstiel: Haltung in der Pflanzenmitte	Peciolo: porte a la mitad de la planta		
	erect	dress�	aufrecht	erecto	Arsis	1
	semi-erect	demi-dress�	halbaufrecht	semi-erecto	Vates	3
	horizontal	horizontal	waagerecht	horizontal	Kobolt	5
17. 180-220	Petiole: length	P�tirole: longueur	Blattstiel: L�nge	Peciolo: longitud		
	short	court	kurz	corta	Fribor	3
	medium	moyen	mittel	media	Spurt	5
	long	long	lang	larga	Halbhoher gr�ner krauser	7
18. 180-220	Petiole: width	P�tirole: largeur	Blattstiel: Breite	Peciolo: anchura		
	narrow	�troit	schmal	estrecha	Hammer	
	medium	moyen	mittel	media	Halbhoher gr�ner krauser	
	broad	large	breit	ancha		
19. 240	Time of senescence of first leaf	�poque de s�nescence de la premi�re feuille	Zeitpunkt der Vegetationsruhe des ersten Blattes	�poca de senescencia de la primera hoja		
	very early	tr�s pr�coce	sehr fr�h	muy precoz		1
	early	pr�coce	fr�h	precoz		3
	medium	moyenne	mittel	media		5
	late	tardive	sp�t	tard�a		7
	very late	tr�s tardive	sehr sp�t	muy tard�a		9

VIII. Explanations on the Table of Characteristics

Ad. 3: Plant: shape (fully grown plants prior to senescence)



Ad. 4: Only varieties of dome, pyramid or column shape: Plant: position of growing point in relation to top of plant



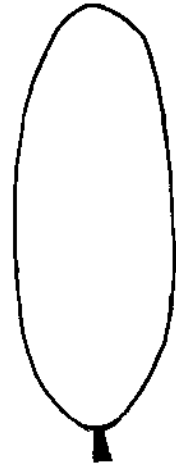
Ad. 10: Leaf blade: shape



1
very narrow elliptic



3
narrow elliptic



5
elliptic

Ad. 13: Leaf blade: curvature of midrib



3
weak

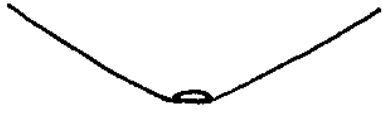


5
medium

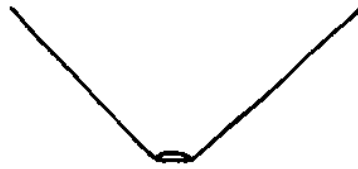


7
strong

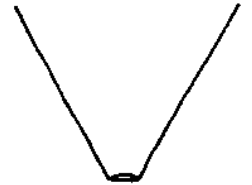
Ad. 15: Leaf blade: folding in transverse section



3
weak



5
medium



7
strong

Key for growth stage (Growth key):

00	dry seed
10	germination
15	fully opened cotyledons
20	early growth of first true leaf
25	early growth of second true leaf
30	first true leaf fully developed
40	second true leaf fully developed
50	third true leaf fully developed
60	fourth true leaf fully developed
100	new leaves developing rapidly
110	early stem formation
140	plant developing mature shape
160	lower leaves becoming coarse and large
180	middle leaves well developed, but not too coarse
200	stem fully developed becoming woody
220	plant fully developed with mature shape
240	lower leaves beginning to senesce
260	leaves at lower and middle part of plant senescing
280	very slow development of new leaves
400	initiation of flowering

X. Literature

IBPGR, 1990: Descriptors of *Brassica* and *Raphanus*. International Board for Plant Genetic Resources, Rome.

Kaloo, G. and Bergh, B.O., 1993: Genetic Improvement of Vegetable Crops. 11 Kale. 187-190. Pergamon Press. New York.

Langer, R.H.M., and Hill, G.D., 1982: Agricultural Plants 8. Cruciferae. 165-183. Cambridge University Press. Cambridge.

Lustinec, J., 1988: III.11 Kale (*Brassica oleracea* L. var. *acephala*, *medullosa*, *ramosa*, *sabellica*). 530-547. In: *Biotechnology in Agriculture and Forestry* 6. Ed: Y.P.S.Bajaj. Springer-Verlag Berlin.

Nieuwhof, M., 1969: Cole Crops: Botany, Cultivation and Utilisation. Leonard Hill, London.

Tsunoda, S., Hinata, K. and Gomez-Campo, C., 1980: *Brassica* Crops and Wild Allies. Biology and Breeding. Japan Scientific Press. Tokyo.

X. Technical Questionnaire

	<p>Reference Number (not to be filled in by the applicant)</p>
<p style="text-align: center;">TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights</p>	
<p>1. Species: <i>Brassica oleracea</i> L. convar. <i>acephala</i> (DC) Alef. var. <i>sabellica</i> L. CURLY KALE</p>	
<p>2. Applicant (Name and address)</p>	
<p>3. Proposed denomination or breeder's reference</p>	

4. Information on origin, maintenance and reproduction of the variety

4.1 Origin and breeding method

- | | |
|-----------------------------|-----|
| (a) Open-pollinated variety | [] |
| (b) Single hybrid | [] |
| (c) Three-way hybrid | [] |
| (d) Other (indicate type) | [] |

.....

4.2 Other information

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the state of expression which best corresponds).

Characteristics	Example Varieties	Note
5.1 Plant height (1)		
short	Niedriger gr�ner krauser	3[]
medium	Frosty, Hammer	5[]
tall	Westlandse Herfst	7[]
5.2 Plant: shape (fully grown plants prior to senescence) (3)		
flat	Kobolt, Lav Kruset	1[]
dome	Fribor	2[]
pyramid	Moosbor	3[]
column	Arsis, Westlandse Herfst	4[]
5.3 Plant: anthocyanin coloration (5)		
absent	Lerchenzungen, Pentland Brig	1[]
present	Garna Red	9[]
5.4 Leaf blade: color of <u>fully developed</u> leaf (8)		
yellow green	Hammer	1[]
green	Frosty	2[]
grey green	Lerchenzungen	3[]
blue green	Vates	4[]
blue		5[]
red or purple	Garna Red	6[]

Characteristics	Example Varieties	Note
5.6 Leaf blade: shape (10)		
very narrow elliptic	Lerchenzungen	1[]
very narrow elliptic to narrow elliptic	Kobolt	2[]
narrow elliptic	Hammer	3[]
narrow elliptic to elliptic	Frosty, Halbhoher gr�ner krauser	4[]
elliptic	Westlandse Herfst	5[]
5.7 Leaf blade: length (11)		
short	Vates	3[]
medium	Spurt	5[]
long	Lerchenzungen	7[]
5.8 Leaf blade: width (12)		
narrow	Vates	3[]
medium	Spurt	5[]
broad	Westlandse Herfst	7[]
5.9 Leaf blade: density of “curling” (on leaves at middle of plant) (14)		
flat leaf with coarse margin undulation	Pentland Brig	1[]
medium margin undulation with small area of flat leaf visible	Garna Red	2[]
fine margin undulation with small area of flat leaf visible	Westlandse Herfst	3[]
fine margin undulation with no flat leaf visible	Halbhoher gr�ner krauser	4[]
5.10 Petiole: attitude at middle of plant (16)		
erect	Arsis	1[]
semi-erect	Vates	2[]
horizontal	Kobolt	3[]

6. Similar varieties and differences between these varieties

Denomination of similar variety	Characteristic in which the similar variety is different ^{o)}	State of expression of similar variety	State of expression of candidate variety
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^{o)} In the case of identical states of expressions of both varieties, please indicate the size of the difference.

7. Additional information which may help to distinguish the variety

7.1 Resistance to pests and diseases

7.2 Other information

8. Authorization for release

- (a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [] No []

- (b) Has such authorization been obtained?

Yes [] No []

If the answer to that question is yes, please attach a copy of such an authorization.

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